IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Gopalakrishnan G. Juttu
Robert Scott Smith

Serial No.: 10/792,319 Group Art Unit: 1764

Filed: December 30, 2005 Examiner: Thuan D. Dang

For: Catalyst for Aromatization of Alkanes, Process of Making and Process of Using Thereof

Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

AFFIDAVIT UNDER 37 CFR §1.132

Gopalakrishnan G. Juttu, being duly sworn, deposes and says that:

I am a scientist for SABIC Americas, Inc., at the SABIC Technology Center in Sugar Land, Texas.

My educational background is as follows: I hold a Bachelor of Science degree in Chemical Engineering from the Indian Institute of Technology, Madras, India granted in 1996 and a Doctor of Philosophy degree in Chemical Engineering from the University of Delaware granted in 2001.

My duties at the SABIC Technology Center include research in the field of catalytic reaction of an alkane using a zeolite catalyst to produce aromatics, including the synthesis and evaluation of catalysts such as those disclosed in U.S. patent no. 4,891,463 ("Chu") and U.S. Patent no. 4,416,806 ("Bernard").

I have worked in the field of catalysis, both in industry and in academia, for approximately eight years. I am the author or co-author of three articles on the subject and have approximately three patents issued and approximately three patent applications pending naming me as an inventor or co-inventor in this field.

In view of my qualifications as specified above, I consider myself to be an expert in the art of alkane aromatization and related catalysts, specifically the catalytic reaction of an alkane using a zeolite catalyst to produce aromatics. I have read the Office Action of March 1, 2006, for the above-identified patent application and I have reviewed and am familiar with the subject matter disclosed in Chu and Bernard.

The following Examples and Comparative Example illustrate a catalyst of the claimed invention compared to catalysts containing other metals disclosed in Chu.

Synthesis of Catalysts

Ga-ZSM-5 was synthesized based on a modified recipe taught in Example 1 of Chu. 20g of CBV28014 (ZSM-5 with SiO_2/Al_2O_3=280 from Zeolyst) was refluxed with 0.1M HCL overnight. The zeolite was filtered and washed with deionized water. The zeolite was subsequently refluxed with a 100ml aqueous solution containing 0.8g NaOH and 5g $Ga(NO_3)_3$ hydrate for two hours. The zeolite was bound with silica (50wt% zeolite 50wt% silica). The catalyst was split into four equal parts of 5.85g each. Three parts were impregnated as follows:

Table 1 Salts used to add metal content to the catalyst

Name	Salt	Weight (g)
Pt/Ga-ZSM-5	Tetra amine platinum (II) nitrate	0.0585
Zn/Ga-ZSM-5	Zinc nitrate hexahydrate	0.1365
Re/Ga-ZSM-5	Ammonium perrhenate	0.0452

Catalyst Testing

4g of each catalyst was tested for propane aromatization activity. The catalyst was pretreated with hydrogen, hydrogen sulfide and hydrogen sequentially. The catalysts were tested at 500°C, 20psig and $1h^{-1}$ WHSV with a pure propane feed. The results from the catalytic tests are summarized in the table below:

Table 2 Catalytic testing summary of the catalysts

Catalyst	Conversion (%)	BTX Yield (%)
Ga-ZSM-5	11.09	4.00
Pt/Ga-ZSM-5	32.24	13.72
Re/Ga-ZSM-5	23.03	9.07
Zn/Ga-ZSM-5	6.65	2.04

As can be seen from the data, Pt/Ga-ZSM-5 is the most active catalyst and also has the highest yield to the BTX (benzene, toluene and xylene) products.

Further deponent saith not.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affix my signature this 31 day of August, 2006.

Gopalakrishnan G. Juttu

Gopalakrishnan G. Juttu

On this 31st day of August, 2006, personally appeared before me, Gopalakrishnan G. Juttu, known to me to be the person who executed the foregoing affidavit and acknowledged the same to be his free act and deed.

Jim D. Wheelington

Jim D. Wheelington
Notary Public
My Commission expires June 7, 2009